BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY

School of Health Sciences
Program: Medical Radiography
Option:

Course Outline

MRAD 2222
Image Recording, Equipment and Quality Control 2

Start Date: September, 2001 **End Date:**

Course Credits: **Term/Level:** 2

Total Hours: 14
Total Weeks: 7

Hours/Week: 2 **Lecture:** 2 **Lab:** **Shop:** **Seminar:** **Other:**

Prerequisites

Course No.	Course Name
MRAD 1101	Image Recording, Equipment and Quality Control 1

MRAD 2222 is a Prerequisite for:

Course No.	Course Name
MRAD 3313	Image Recording, Equipment and Quality Control 3

Course Calendar Description

Through lectures and readings, this course will deal with x-ray tubes; circuits and generators, and fluoroscopic principles and equipment. In particular, x-ray tubes will be described in terms of recent technical advances, followed by a detailed discussion of the principles and instrumentation for fluoroscopy.

Course Goals

To provide students with a knowledge of the fundamental principles of x-ray tubes, generators and circuits needed for effective utilization and operation of radiographic equipment and to describe the characteristic features of fluoroscopic equipment.

Evaluation

Final Examination	50%	Both examinations will be of the multiple choice format.
Mid-Term Examination	30%	
Laboratory QC Report	10%	The format of the Lab Report will be discussed in class.
1 Quiz	10%	
TOTAL	100%	

Course Learning Outcomes/Competencies

Upon successful completion of this course, the student will be able to:

1. Describe the major components of the x-ray generator and its associated circuitry.

2. Differentiate between different types of x-ray tubes.

3. Explain how x-ray exposure timers work.

4. Describe the principles of fluoroscopy and outline the characteristic features of fluoroscopic equipment.

On successful completion of these outcomes, students will be prepared to meet the requirements of the following competencies as listed in the CAMRT "Competency Profile" for Radiography.

A2 Prepare the room for fluoroscopic imaging procedures.
- A2.5 Obtain accessory imaging equipment.
- A2.6 Select the correct image receptor system (conventional vs digital).

A4 Position the patient.
- A4.10 Collimate to the area of interest only to maximize image quality.

A5 Operate imaging equipment.
- A5.1 Select and use apparatus and accessory equipment safely.
- A5.2 Perform the initial set-up of the equipment.
- A5.3 Select the computer protocol for digital imaging.
- A5.4 Select the source-image distance.
- A5.5 Use radiographic markers.
- A5.6 Select the fastest film/screen/grid combination for optimum image quality appropriate for the examination.
- A5.7 Select appropriate kV, mA and time or automatic exposure control parameters.
- A5.8 Modify exposure factors on the basis of the patient's age, physique and condition.
- A5.9 Take the exposure.

A6 Process images.
- A6.1 Imprint ID information.
- A6.2 Manipulate computer data, if applicable.
- A6.3 Unload the film cassette/magazine and process exposed film.
- A6.4 Reload the cassette/magazine.

Course Learning Outcomes/Competencies (continued)

A7 Critique images and implement corrective measures.
- A7.8 Manipulate the digital image.

D2 Monitor radiographic/fluoroscopic equipment.
- D2.1 Perform visual inspection of cables and equipment.
- D2.2 Recognize improper functioning of imaging and accessory equipment/devices.
- D2.3 Ensure the proper operation of safety devices.
- D2.4 Record and report equipment malfunctions to the appropriate person.

D3 Perform quality control tasks.
- D3.1 Perform quality control tests on imaging and accessory equipment.
- D3.2 Use test results to initiate corrective action.
- D3.3 Record and maintain records/charts of all tests.
- D3.4 Test lead aprons and shields.
- D3.5 Report test results to appropriate person.
- D3.6 Conduct repeat/reject analysis.

Course Content Verification

I verify that the content of this course outline is current, accurate, and complies with BCIT Policy.

M. Iubelli
Program Head/Chief Instructor

August 2001
Date

Note: Should changes be required to the content of this course outline, students will be given reasonable notice.

Instructor(s)

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Learning Resources

Required:

- Bushong, S. Radiologic Science for Technologists. Mosby-Year Book, Inc. 6th Edition, 1997.

Additional References:

- Seeram, E., Rad Tech's Guide to Equipment Operation and Maintenance, Blackwell Science, Inc. 2001

BCIT Policy Information for Students

Assignment Details

Week	Material Covered	Reference/Reading
Week 1	**Course Introduction** • Learning Outcomes • References • Evaluation **X-Ray Generators and Associated Circuitry** • What is a generator? • Purpose • Types of Generators • Associated Circuitry • Ratings	Seeram, E. Course Outline Bushong, Ch. 9
Week 2	**X-Ray Tubes** • Stationary-Anode Tubes • Rotating-Anode Tubes • New Anode Disk Technology	Bushong, Ch. 10
Week 3	**X-Ray Tubes (continued)** • Recent Developments in X-Ray Tubes • Specialized X-Ray Tubes	Bushong, Ch. 10
Week 4	**X-Ray Exposure Timers** • Electronic Timers • Automatic Exposure Timers	Bushong, Ch. 9
Week 5	**MID-TERM EXAMINATION** The exam is based on all materials covered up to Week 4 and will be held on the first hour of class.	Seeram, E.
Week 5	**Fluoroscopy** • Overview • Special Demands • Fluoroscopic Technique	Bushong, Ch. 25
Week 6	**Fluoroscopy** • Image Intensification • The Image Intensifier Tube • Multifield Image Intensification	Bushong, Ch. 25
Week 7	**Fluoroscopy** • Television Monitoring • Charge Coupled Device • Image Recording • Introduction to Digital Fluoroscopy • Radiation Protection Considerations	Bushong, Ch. 25

Week	Material Covered	Reference/Reading
Week 8	**FINAL EXAMINATION**	Seeram, E.
	The final examination is based on the entire course, however, the exam will be weighted on topics after the mid-term. Best wishes.	